A Case Report

Single Sitting Chairside Customized Zirconia Crown in Pediatric Dentistry: A Case Report

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Abstract

In paediatric dentistry as in other dental specialties, digital technologies are replacing non-digital/analogue technologies for creating restorations and developing diagnostic scenarios toward the improvement of patient care. This article will explore the use of digital dentistry, including CAD/CAM, and its potential to become the dominant means of care in paediatric dentistry presenting with the digital workflow in fabrication of zirconia crown. Use of digital dentistry is likely to become more efficient and cost-effective for the treatment of young patients as the technology improves and the cost of equipment decreases.

Keywords: CAD/CAM, digital workflow, digital technologies

INTRODUCTION

Maintaining functional and aesthetic aspects, contributing to keep normal articulation and securing the necessary space for the eruption of permanent teeth are some of the reasons why more primary teeth are treated by practitioners. Nowadays, more interest is directed toward treating and restoring primary teeth rather than extracting them. Despite the new technologies used in order to improve dental materials in the last decade, restoring primary teeth still contributes to a difficult challenge in paediatricdentistry. When the patient is child, dentist must have knowledge, skills, materials and good behavioural management but these are not enough alone. Parental satisfaction is also necessary [1].

Digital impressions represent innovative methods that enable dentists to construct a virtual, computer-generated copy of the hard and soft tissues of the oralcavity, with the use of lasers and other optical scanning machines. The digital method captures impression data with great accuracy, in minutes, without the need for traditional impression resources that some patients find inopportune and messy. Numerous patients consider digital impressions to be an easier and more comfortable method, in comparison with classical impression techniques. The impression information is then moved to a computerized workstation that creates restorations.

Once the impression is captured, it can be either sent to the laboratory/ in house manufacturing unit, or to the CAD/CAM application with the help of one click, and in a second, the laboratory or chairside system receives all the information needed.[3]

The digital workflow in dentistry has a rapid and effective evolution. Its application in the clinic and the laboratory improves the work of dentists, dental technicians and patient satisfaction. New technologies positively influence the diagnosis, application of new therapies, materials & communication. Another advantage is the execution of treatments in a shorter time and with greater precision in the field of fixed prosthesis [4]. The digitalization of the workflow including scanners and printed models enables its accurate application in the clinic for linear segments [5]. Conventional techniques such as impressions by trays and impression materials have been replaced by the acquisition of the images of the preparations through the intraoral scanners.

Restoring primary teeth with crowns has many advantages, including longevity, ease of application and less restorative

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microleakage. In this present article, through a clinical case, we present the protocol and implementation of a zirconia crown on primary tooth prepared with digital workflow and its follow-up.

CASE REPORT

An 8-year-old boy came to clinic with decayed tooth and pain in mandibular back region. A medical, as well as clinical history, was taken along with the radiographic examination, which showed the presence of deep dentinal caries with pulpal exposure and extensive loss of tooth structure in the right primary mandibular 2nd molar. The tooth was found to be tender on percussion. **(Figure1a, b)**

The tooth required a full-coverage restoration after endodontic treatment; both the child and the parent were highly concerned with the aesthetic appearance of the restoration. We decided to restore the primary mandibular right second molar with a paediatric zirconiacrown using intraoral scanning and chairside milling.

We achieved local anaesthesia with NOIS (Nitrous OxideInhalational Sedation).We have modified our protocol here for the procedure exclusively for digital dentistry in paediatric patients; here we directly went on for tooth preparation, therebyutilizing the time taken by local anaesthetic to express its effect.

Scanning was done by intraoral scanner (Dentsply Sirona Omnicam) after minimal tooth preparation to capture a digital impression for further processing in CEREC software. (**Figure2)**

A Digital record of the segment with opposing arch was also recorded. Scanning provides easier, more intuitive, and precise 3D models in natural colours in less than 2 minutes. (**Figure 3)**

After this we perform Pulpectomy procedure meanwhile designing and milling of the restoration was done by supporter staff. **(Figure 4 a, b)**

Designing was done in 5 minutes followed by milling in the primemill which took around 11minutes. **(Figure 5a, b,c)**

By the time pulpectomy was done we utilise time by preparing zirconia crown with chairside milling. Sintering was done which provide adequate strength and glazing is done prior to cementation which makes surface more plaque resistant. The tooth and the crown were cleaned of all blood residues. A glass ionomer cement(Fuji One PLUS, GC, Louvain, Belgium) was used for the cementation. **(Figure6a,b)**

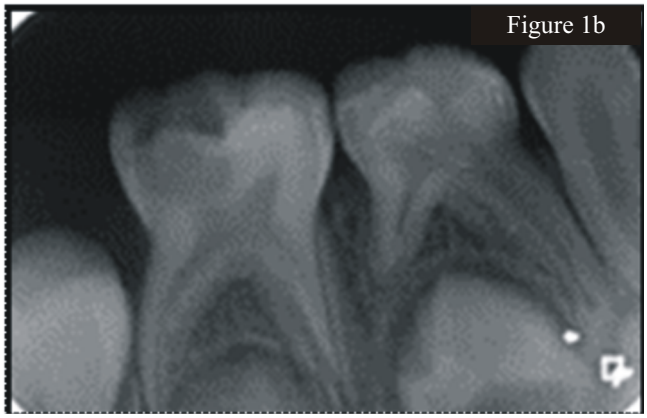


Figure 1a: Intraoral photograph ,1b IOPA of right primary mandibular 2nd molar

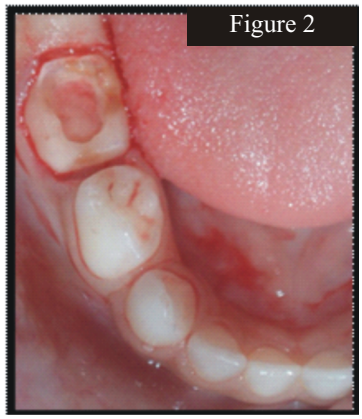


Figure 2: Minimal tooth preparation

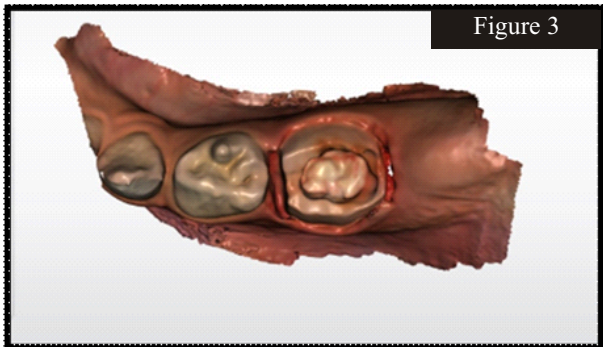


Figure 3: Intraoral scan

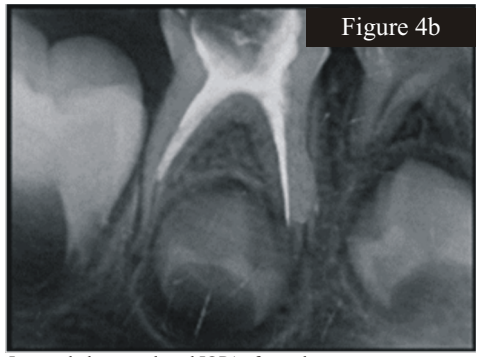
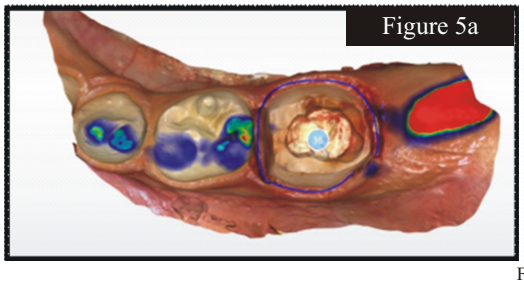
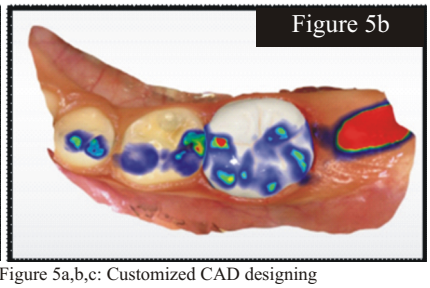


Figure 4 a, b: Intraoral photograph and IOPA after pulpectomy





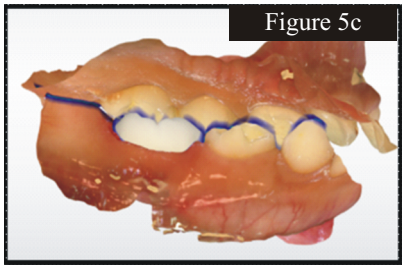


Figure 5a,b,c: Customized CAD designing

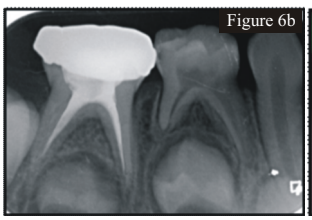


Figure 6 a,b: Cementation done

Figure 7 a, b: Occlusion was checked

Excess cement was removed from interdental spaces and group function occlusion was checked. The patient was given post-operativeinstruction. **(Figure 7 a,b)**

In a matter of less than 45 minutes, complacent, enjoyable, and acceptable results were achieved. As shown in this case, we reconstituted not only the form and function but also the aesthetics with minimally invasive dentistry in a single sitting with the help of the CEREC workflow.

DISCUSSION

Aesthetic treatment of severely decayed primary teeth is one of the greatest challenges for pediatric dentists. The use of aesthetic restoration has become an important aspect of pediatric dentistry. Over the years, numerous techniques for restoring primary teeth have been attempted. This case report describes a single-visit fabrication of zirconia crown on a primary molar. To limit chair side time and promote the quality of care given, CAD/CAM technology could be used in cases when a crown on primary tooth is needed. With the help of the digital design software, clinician can provide better minimally invasively marginal fit crowns without traditional impression procedures in non-competent child patients.

Complete digital workflow through chair side systems allows indirect restorations to be carried out in same clinical session in which preparations are made. This prevents temporization, inflammation of tissues, greater comfort for patient and a rapid workflow for dentist [6].

This in comparison with procedures where several sessions were performed, and laboratory work required more time between session and session [7]. Quality of adjustment of restorations made through CAD-CAM systems is equal to or better than restorations performed conventionally both in clinic [8] and in a laboratory using indirect techniques on physical models obtaining clinically acceptable results [9].

Materials used provide aesthetic properties and can be adhesively cemented improving predictability of restorations. Design of restorations can be replicated according to what was planned in initial stage, so there is greater predictability of treatment. This procedure is limited to segments of intraoral arch. This protocol can be applied to enough, adequate and precise preparations, as well as supra or paragingival preparations [10,11].

Advantages of digital impression include simplicity, elimination of "dirty" cabinet and patient discomfort. Method has no issues of incorporating air bubbles. However, close attention should be directed towards not acquiring artifacts due to saliva, gum margins, and sites in oral cavity. There is no need for storage space or purchase of spoons and impression materials. Risk of contamination is reduced, and disinfection needed by classical impressions is not a must for digital impression technique.

Disadvantages of method include lack of familiarity among dentists. It is not aknown concept and mastered by all. Equipment is sophisticated, although lately it has been greatly simplified, and it takes training and practice to acquire technique. Cost of equipment is high, but after depreciation it becomes cheaper than conventional technique. Comparative studies between conventional and digital impression in terms of accuracy suggest that there is a small similarity. However, it requires long-term clinical studies to highlight that these systems are superior in terms of accuracy for the restorations.[3]

CONCLUSION

The ceramic materials and CAD/CAM technologies, are increasingly being used in aesthetic dentistry for both adults and children. There are many evidences in the literature for CAD/CAM technology usage in primary and permanent dentition in childhood age. This gives the possibility to restore children's dentition with contemporary metal-free ceramic constructions, providing better adhesive, aesthetic and functional restorations in single sitting.

REFERENCE

1. A.A. Sharaf et al.: A clinical and radiographic evaluation of stainless-steel crowns for primary molars J Dent (2004)
2. Digital Impressions: Virtually Perfect. Available at: http://www.yourdentistryguide.com/digital-impressions
3. Gabor AG, Zaharia C, Stan AT, Gavrilovici AM, Negru□iu ML, Sinescu C. Digital Dentistry: Digital Impression And CAD/CAM System Applications:Journal of Interdisciplinary Medicine. 2017;2):54-57. DOI: 10.1515/jim20170033.
4. Joda T, Zarone F, Ferrari M (2017) The complete digital workflow in fixed prosthodontics: a systematic review. BMC Oral Health 17(1): 124.
5. Wesemann C, Muallah J, Mah J, Bumann A (2017) Accuracy and efficiency of full-arch digitalization and 3D printing: A comparison between desktop model scanners, an intraoral scanner, a CBCT model scan, and stereolithographic 3D printing. Quintessence Int 48(1): 41-50
6. Sannino G, Germano F, Arcuri L, Bigelli E, Arcuri C, et al. (2014) CEREC CAD/CAM Chairside System. Oral Implantol (Rome) 7(3): 57-70.
7. Sailer I, Benic GI, Fehmer V, Hämmerle CHF, Mühlemann S (2017) Randomized controlled within-subject evaluation of digital and conventional workflows for thefabrication of lithium disilicate single crowns. Part II: CAD-CAM versus conventional laboratory procedures. J Prosthet Dent 118(1): 43-48.
8. Zarauz C, Valverde A, Martinez Rus F, Hassan B, Pradies G (2016) Clinical evaluation comparing the fit of all-ceramic crowns obtained from silicone and digital intraoral impressions. Clin Oral Investig 20(4): 799-806.
9. Dolev E, Bitterman Y, Meirowitz A (2019) Comparison of marginal fit between CAD-CAM and hot-press lithium disilicate crowns. J Prosthet Dent 121(1): 124-128.
10. N. C. Lawson, K. Frazier, A. K. Bedran-Russo, S. Khajotia, J. Park, and O. Urquhart, "Zirconia restorations: an American Dental Association Clinical Evaluators Panel survey," Journal of the American Dental Association (1939), vol. 152, no. 1, pp. 80-81.e2, 2021.
11. S. Kongkiatkamon, K. Booranasophone, A. Tongtaksin, V. Kiatthanakorn, and D. Rokaya, "Comparison of fracture load of the four translucent zirconia crowns," Molecules, vol. 26, no. 17, p. 5308, 2021.